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SPECIFICATION FOR MUSCOVITE MICA COMPONENTS FOR ELECTRONIC EQUIPMENT

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SPECIFICATION FOR MUSCOVITE MICA COMPONENTS FOR ELECTRONIC EQUIPMENT

Mica Sectional Committee, ETDC 9

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(*Continued on page* 2)

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Indian Standard

SPECIFICATION FOR MUSCOVITE MICA COMPONENTS FOR ELECTRONIC EQUIPMENT

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 12 May 1980, after the draft finalized by the Mica Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 Components made of muscovite mica are used in electronic equipment, vacuum tubes, gas discharge devices, etc. The object of this standard is to lay down minimum technical requirements, test methods and acceptance conditions for muscovite mica components for electronic equipment.

0.3 While preparing this standard, considerable assistance has been derived from ISO 5816-1979 'Muscovite mica components for electronic equipment', issued by the International Organization for Standardization.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers requirements of stamped components of muscovite mica of diameter up to and including 40 mm for use in electronic equipment. It covers components made from natural block mica only.

1.2 This standard does not deal with fabricated or processed mica components.

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*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions given in IS : 1885 (Part LIII)-1980* shall apply.

3. BASIC DIMENSIONS

3.1 Classification

3.1.1 The components are classified into three groups according to size:

a) Group I — components that fit into a circle of diameter 15 mm or less,

b) Group II — components that fit into a circle of diameter more than 15 mm but not more than 25 mm, and

c) Group III — components that fit into a circle of diameter more than 25 mm but not more than 40 mm.

3.2 Thickness — The mica components are manufactured in thicknesses ranging from 0·1 to 0·5 mm. The thickness shall be uniform to within 0·02 mm.

4. REQUIREMENTS

4.1 General — The shape and size of the component as well as the tolerances on the dimensions shall be according to the purchaser's drawings agreed to by the supplier.

4.2 Surface Characteristics — The surface of the component shall be reasonably flat according to the specimen sample, as agreed to between the purchaser and the supplier. The convexity of the surface of the component permitted shall be agreed to between the purchaser and the supplier.

4.3 Cracks

4.3.1 *Through Cracks* — Through cracks joining the periphery of the components to the inside opening and between the openings shall not be allowed. The total length of cracks running from opposite directions between any two adjacent openings or any opening and the periphery of the component shall not exceed one-third of the space between them; the length of any through cracks running from opposite directions shall be not more than one-fourth of the width of the bridge.

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*Electrotechnical vocabulary: Part LIII Mica.

Provided the purchaser and the supplier agree, through cracks of lengths up to 3 mm can be allowed, if the total length of such cracks from opposite directions between two adjacent openings or between the opening and the periphery of the component does not exceed half the distance between them.

If the distance between the openings is 2 mm or less, the total length of through cracks running from opposite directions shall not exceed one-third of the width of the bridge.

4.3.2 *Not-Through Cracks* — Not-through cracks up to a depth of one-third of the thickness of the component shall be allowed between the openings or between the openings and the periphery of the components.

4.4 Holes — Holes within 2 mm of the opening or periphery shall not be permissible. The exact type of holes which may be permitted shall be agreed to between the purchaser and the supplier according to the specimen supplied.

4.5 Foreign Material — Inclusion of foreign minerals (such as felspar, quartz and other minerals of pegmatite) and impurities such as ' oil ' stains are not allowed.

4.6 Stains — Stains of various colours, other than those due to rust or corrosion, are allowed on the surface of the component provided that the total area covered by the stains does not exceed 10 percent of the total surface area of the component for Group I, and 25 percent for Groups II and III (*see* **3.1.1**).

4.7 Spots — Black spots distributed at distances of less than 1 mm from the periphery of the internal opening and on bridges of width less than 3 mm are not allowed.

4.8 Lamination — The size and type of lamination on the external periphery and on the periphery of the internal openings shall be according to the sample agreed upon by the purchaser and the supplier.

4.9 Defects and Fins — The size, type and location of defects, fins and holes shall be according to the sample agreed upon by the purchaser and the supplier.

4.10 Scratches — Scratches due to knife or blade shall not be considered as grounds for rejection.

4.11 Teeth — Components with the teeth chipped off shall not be permitted. Such components detected during the test are rejected and counted in the sum of the components not complying with the standard (*see* **6.4**).

5. SAMPLING AND CRITERIA OF ACCEPTANCE

5.1 General — The components in each box of supply shall be tested for acceptance. Samples are taken from each parcel box.

NOTE — If components of different block stamp are packed in the same box, samples shall be taken of each block stamp separately.

5.2 Sample Size — From each box, 0·5 percent of the components with a minimum of 100 shall be sampled for testing of the supplied components to check compliance with all the requirements of this standard. Samples shall be drawn at random so as to be representative of the lot.

5.3 Criteria for Acceptance — If the sum of all the components failing to comply with the requirements of **4.2** to **4.11** is less than or equal to 8 percent of the samples taken, all the pieces in the box shall be considered as having passed. If the sum of the components which fail is more than 8 percent, double the number of samples are taken in the same order as before, and retested.

If then, the sum of all the components which fail is less than or equal to 8 percent of the samples taken, all the pieces in the box shall be considered as having passed. If the sum of the components which fail is more than 8 percent, all the pieces in the box, shall be rejected.

6. TEST METHODS

6.1 Visual Examination — The components are checked for compliance with **4.2** to **4.11** by visual inspection and comparison with standard specimens.

6.2 Thickness — The thickness of the component is measured with a dial gauge provided with a spherical point and with an accuracy of 0·01 mm. The uniformity and correctness of the thickness shall be checked. The radius of the sphere of the clamping terminal shall be 1·6 mm.

6.2.1 *Tolerances on Thickness* — The tolerances on thickness specified in the drawings shall not exceed:

a) the lower tolerance limit — in more than 5 percent of the components, and

b) the upper tolerance limit — in more than 20 percent of the components.

The amount of deviation shall in no case be more than +0·1 mm.

6.3 Depth of Cracks — The approximate depth to which cracks have penetrated shall be estimated by visually examining the opposite side of the cracked surface against a light source. Alternatively, the actual depth to which cracks have penetrated can also be determined by splitting the cracked side of the component in to several parts till all the cracked films are lifted and measuring the thickness of each individual films with a dial gauge.

6.4 Dimensions of Openings — Fifty pieces shall be picked out from the sample batch for verifying the dimensions of the openings with 'Go — No-Go' gauges.

6.4.1 *Round Openings* — The dimensions of round openings shall be checked with a set of 'Go — No-Go' gauges. The opening shall be considered to be within acceptable tolerances if the 'Go' gauge passes freely and the 'No-Go' gauge does not pass through it.

As an alternative, projection method as given in **6.4.2.1** may be employed subject to agreement between the purchaser and the supplier.

NOTE 1 — If the tolerance on the opening is 0·03 mm or less, up to 20 percent of the components tested may have openings through which passage is possible for the gauge which is one unit (equivalent to 0·01 mm) above the maximum permissible dimensions, or impossible for the gauge which is one unit below the minimum permissible dimensions; but even in such openings, passage should be possible for the gauge which is 2 units (equivalent to 0·02 mm) above the maximum allowed dimensions, or impossible for the gauge which is 2 units below the minimum allowed dimension.

NOTE 2 — If the tolerance on the opening is more than 0·03 mm, not more than 5 percent of the components tested may have openings through which passage is possible for the gauge which is one unit (equivalent to 0·01 mm) above the maximum permissible dimensions or impossible for the gauge which is one unit below the minimum permissible dimensions, but even in such openings, passage should be possible for the gauge which is 2 units (equivalent to 0·02 mm) above the maximum allowed dimensions or impossible for the gauge which is 2 units below the minimum allowed dimension.

6.4.2 *Irregular Openings* — For determining the layout of the openings as well as the dimensions and shape of irregular openings, a sample of not less than 5 components shall be taken from the box. The components shall be adjusted satisfactory if the arithmetic mean of each dimension is within the limits allowed in the drawing. Otherwise, double the number of pieces shall be taken and tested again; if inadequacies in the layout of the openings are found in this new test also then all the components from this box shall be rejected.

6.4.2.1 *Projection method for dimensions of openings* — The dimensions of irregularly shaped openings shall be checked with a profile projector by the method of superimposing the drawing of the component on the projection of the openings at a magnification of 50 times. The opening shall be adjudged satisfactory if its projection coincides with the drawing and remains within the specified tolerances.

6.4.2.2 *Microscopic method or projection method for relative disposition of openings* — The relative disposition of the openings and the dimensions of the components according to the drawing shall be verified on a Shop Measuring Microscope or on a Profile Projector by the method of superimposing the drawing on the projected image of the component under a magnification of 10 to 30 times. The component shall be considered as conforming to the drawing if all the contours of the projected image of the component coincide with the drawing, or its dimensions do not exceed the specified tolerances.

NOTE — It is essential that the drawing which is superimposed on the profile of the component has to be accurately made; preferably on a co-ordinatograph. These drawings shall also be made on durable non-shrinking special material (mylar or polythene).

6.5 Geometrical Dimensions — The initial basis for the measurement of the geometrical dimensions of the component shall be established according to drawings or catalogue, with the agreement between the purchaser and the supplier.

6.6 Radii of Rounding — The radii of rounding in the components shall be checked by projecting the image and superimposing the drawing over the image.

6.7 Permissible Tolerances — The permissible tolerances in measurement unless otherwise specified by the buyer, shall be as given in Table 1.

TABLE 1 PERMISSIBLE MEASUREMENT TOLERANCES

DIMENSIONS	TOLERANCE
Exposed linear dimensions	±0·1mm
Exposed angular dimensions	±45 minutes (angular)
Shift of openings from component axis	As specified in drawing; otherwise ±0·05 mm
Misalignment and other deviations from the form of opening	As specified in drawing; otherwise ±0·05 mm
Radii of curves in component	± 0·05 mm
Asymmetry of location of openings	As specified in drawing; otherwise 50 percent of tolerance

6.8 Area of Stains or Spots — The component plate to be tested shall be placed on a stand and illuminated from below. A square piece of translucent graph paper of 1 mm size shall be placed on the plate; the graph pattern being made of small squares. Each square, of which the stain covers more than half the area, shall be denoted by a plus (+) sign; each square, of which the stain covers less than half the area, shall be denoted by a minus (—) sign and squares where there is no stain shall be given the zero (0) sign.

In this way, all the squares inside the plate are marked. For the purpose of evaluation, two categories, namely, squares with the stain, marked with a plus (+) sign; and squares without the stain, marked with a zero (0) sign shall be taken into account. Of the squares marked with a minus (—) sign one half shall be added to each category.

The ratio of the number of squares with stain to the total number of squares gives the percentage area occupied by the stains.

7. PACKING

7.1 The components shall be packed in paper packets, each having a mass of 200 g to 500 g. The packets shall be tightly packed in sturdy boxes with inside paper lining.

7.2 Each box shall contain only components of the same block stamp. The gross mass of each box with the components shall not exceed 20 kg.

> NOTE — Components of different block stamps (according to the same drawing) may be packed in the same box, but it is obligatory to indicate the name of the block stamp (s) on each packet.

8. MARKING

8.1 Every box shall be labelled having the following information clearly and indelibly marked on it:

a) Number of the box;
b) Purchaser's name;
c) Supplier's name;
d) Name of the article;
e) Gross and net masses; and
f) Any other information as agreed to between the manufacturer and the purchaser.

8.1.1 The box may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may by granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8.1.2 *Markings on Accompanying Document* — Each box shall contain an accompanying document signed by the responsible official. This document shall contain the following information:

a) Name of the manufacturer;

b) Date of packing;

c) Number of box;

d) Number of packets in the box and number of components in each packet;

e) Reference and number of the drawing of the detail;

f) Number of block stamp(s); and

g) Mass and number of the components in the box.

9. TRANSPORT AND STORAGE

9.1 During transport and storing, the components shall be protected from moisture and the boxes shall be protected from mechanical damage.

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ON
MICA

IS:	
1175-1957	Methods for grading and classification of muscovite mica blocks, thins and films
1885 (Part LIII)-1980	Electrotechnical vocabulary: Part LIII Mica
9043-1979	Method for grading (by size) of phlogopite mica blocks, thins and splittings
9044-1979	Method of measuring thickness of mica blocks, thins, films and splittings
9045-1979	Thermal classification of phlogopite mica splittings
9455-1980	Classification of muscovite mica blocks, thins and films based on electrical properties
9502-1980	Muscovite mica components for electronic equipment

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